

REMARKS

Claims 1-8 and 10-20 are presented for further examination. Claims 1-4, 7, 11, and 12 have been amended.

In the Office Action mailed June 10, 2009, the Examiner rejected claim 2 under 35 U.S.C. § 112, second paragraph, as indefinite. Claims 1, 4-8, 10-13, and 15-20 were rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent Publication No. 2002/0097812 (“Wiss”). Claim 2 is rejected as obvious over Wiss in view of U.S. Patent No. 6,289,048 (“Richards, et al.”). Claim 14 was rejected as obvious over Wiss in view of U.S. Patent No. 6,442,217 (“Cochran”).

Applicant respectfully disagrees with the bases for the rejections and requests reconsideration and further examination of the claims.

Section 112 Rejection

Claims 1 and 2 have been amended to address the indefiniteness noted by the Examiner. More particularly, the recitation of the second and third values in claim 1 has been eliminated. Applicant notes, although, that the “second value” and “third value” in claim 1 were recited as being “related to” the I and Q components. In claim 2, the second and third values were explicitly claimed as being a ratio between the I and Q components and a square root of a product involving the I and Q components. Applicant does not believe claim 2 was inconsistent with claim 1 because claim 1 used the broader language of “related to.”

Claim Rejections

Wiss, U.S. Patent Publication No. 2002/0097812, is directed to an in-phase and quadrature-phase rebalancer that has a circuit loop producing a first error signal that varies a first gain function such that its output is a signal that continuously converges towards a balanced in-phase component. Wiss does not disclose estimating phase imbalance or gain imbalance prior to symbol synchronization using a cross correlation of an uncompensated I component and an uncompensated Q component of an incoming modulated signal. According to Figure 5 of Wiss, which was referenced by the Examiner, it appears the rebalancing of the I and Q components of

the modulated received signal uses rebalanced I and Q components. There is no teaching or suggestion in Wiss of using unbalanced I components or unbalanced Q components to estimate phase imbalance or gain imbalance prior to symbol synchronization.

While Wiss does teach a second variable gain function that receives as input the unbalanced in-phase component, this component is used with a summing function in series with an unbalanced quadrature component to algebraically add the unbalanced quadrature component and an output of the second gain function. This output is a secondary signal that varies a second gain function such that the output of the summing function is a signal that continuously converges towards a balanced quadrature component. (See Abstract.)

In contrast, claim 1 is directed towards a circuit that estimates the phase imbalance or gain imbalance prior to symbol synchronization using a first value related to a cross correlation of an uncompensated I component and an uncompensated Q component of an incoming I/Q modulated signal. As discussed above, nowhere does Wiss teach or suggest the claimed estimating circuit in combination with a compensating circuit for estimating and compensating phase imbalance or gain imbalance utilizing a QPSK modulation receiver and a modulation scheme based on a complex scrambling code.

Applicant respectfully submits that claim 1 and dependent claims 2-8, and 9, are allowable.

Independent claim 11 similarly recites the use of an uncompensated I component and an uncompensated Q component of an incoming I/Q modulated signal in a manner similar to that recited in claim 1. Applicant respectfully submits that claim 11 is allowable for the reasons why claim 1 is allowable.

With respect to independent claims 12 and 13, applicant disagrees with the Examiner's rejection based on Wiss. The Examiner takes the position that Figure 5 of Wiss discloses the limitation of "determining a modified error function by adding the integrated and filtered error function to a product of the integrated and filtered error function and a parameter based on speed and stability." However, according to Figure 5 of Wiss, a normalized signal (the output of normalizer 26, 36) is first multiplied by a convergence factor μ_{Φ} at multiplier 28, 38, and added at a summer 32, 42 to an integrated version (integrated by register 30, 40) of the signal

at the output of the multiplier 28, 38. This is not the same as or equivalent to “adding the integrated and filtered error function to a product of the integrated and filtered error function and a parameter based on speed and stability.” In view of the foregoing, applicant respectfully submits that independent claims 12 and 13 and all claims depending from these two independent claims are clearly allowable over Wiss, as well as any combination of Wiss and Richards or Wiss and Cochran, because none of the combinations teach or suggest “adding the integrated and filtered error function to a product of the integrated and filtered error function and a parameter based on speed and stability.”

In view of the foregoing, applicant respectfully submits that all of the claims remaining in this application are in condition for allowance. In the event the Examiner disagrees or finds minor informalities that can be resolved by telephone conference, the Examiner is urged to contact the undersigned by telephone at (206) 622-4900 in order to expeditiously resolve prosecution of this application. Consequently, early and favorable action allowing these claims and passing this case to issuance is respectfully solicited.

Respectfully submitted,
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